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THE MYCOPHILE

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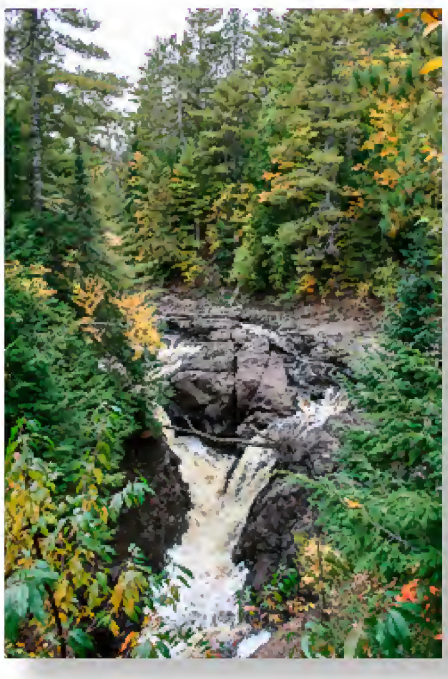
THE 2017 NAMA Northwoods Foray

September 7-10, 2017

Lakewoods Resort, LAKE NAMAkagon (actual name), Wisconsin

Final preparations…it's almost time! If you are planning to attend the 2017 NAMA Annual Foray in the Wisconsin Northwoods in a few weeks, thank you for registering! You are in good company, there will be 350 on hand this year, and the event has been fully registered for several months now. What follows are a few last minute tips as you make your final plans for travel.

Getting there and away. By now you've already decided whether you're flying or driving. I**f flying into the Duluth Airport**, we are offering a shuttle ride to the Lakewoods Resort and back. The trip is about 90 minutes and we're asking for $10 per person each way to defray the cost of fuel and vans, etc. **If you want the shuttle but did not already sign up, do so now by contacting Sam Landes (**samland2@earthlink.net**)**. For other questions about registration, you can contact the Registrar, Connie Durnan (connie.nama@gmail.com).



The Northwoods offer incredible scenery (the fall color change may be underway) and you're in for a treat if driving to the event, or if flying to Minn.-St. Paul airport and taking a rental car. (The drive from MSP is about 3.5 hours, but is uncongested and very pleasant.) If staying in the area or in the Upper Midwest after the foray, see previous newsletters for ideas on great places to visit (or chat me up at the foray).

What to pack. Early September in northern Wisconsin is usually a very pleasant place to be outdoors. In the several years we have held a foray at this site, the forest conditions have always been nicely moist but not usually muddy as the heavy rains typically come in August. Temperatures have ranged from warm t-shirt days (last year) to more typically cooler jacket weather. You would be wise to check weather in the days before heading to Bayfield Co. Cooler weather has the advantage of bringing on the early fall colors and keeping away any signs of mosquitos. There are usually no other pesky insects. There is no poison oak (there is poison ivy but it's not a big deal). There are no snakes or scorpions, or really any other nasty creatures to watch for. Hiking is in general pretty flat with only the slightest of inclines—this is the Midwest.

We do have some forays planned to boggy sites but regular hiking boots should suffice. We have a very exciting all-day foray to the Apostle Islands planned. If that sounds like your ticket and you need Dramamine, pack that. I can recommend some great guide books that you may want to pick up to prepare and acquaint yourself with our Northwoods mushrooms. The first is *Fascinating Fungi of the North Woods* by Cora Mollen and Larry Weber(Kollath & Stensaas Publishing). I love this book (and

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UPCOMING FORAYS & OTHER EVENTS

The events page of *The Mycophile* publicizes forays and events of NAMA affiliated clubs which may be of interest to our members. If you would like to list your club's next big event, contact the Editor: mycophile@namyco.org.
Include date, location, brief description, link for information, and host organization name.
To post your event on the NAMA website, contact the webmaster: webmaster@namyco.org.

SEPTEMBER 1-4: COMA's Clark Rogerson Foray will be returning to the completely refurbished Camp Hemlocks in Hebron CT. with Gary Lincoff, Bill Yule, Roz Lowen and Leon Shernoff. See www.comafungi.org to register.

SEPTEMBER 7-10: NAMA Northwoods Foray at Lakewoods Resort, Lake Namakagon, Wisconsin. Registration is full.

SEPTEMBER 28- OCTOBER 1: WILDACRES 2017 Foray with mycologist Brandon Matheny of the University of Tennessee and others.

SEPTEMBER 28- OCTOBER 1: Missouri Mycological Society (MOMS) at Lake of Ozarks State Park, Kaiser MO. Registration fee $55 members, $65 non-member, high school & college students $40, children 16 and under free. Cabin/barracks $7 per person per night. Camping or hotel on your own. Mycologists will be Denis Benjamin, Michael Kuo and Chris Crabtree. Contact Maxine Stone at VeryMaxine@aol.com.

NEW EDITOR NEEDED for *THE MYCOPHILE*!

AS of this issue, I am stepping down from the position of editor of *The Mycophile*. I feel priveledged to have been able to produce over the past five years a fairly varied 24 page newsletter for NAMA members every two months. I credit my contributors as well as my astute proof-readers Michael Beug, David Rust and especially Steve Trudell for their collective efforts to oversee and ensure the quality and accuracy of the material presented. **Please contact me or David Rust if you think you might like to become editor of *The Mycophile*. The position is perfect for someone who is or was editor of a local NAMA affiliated club.** I will do whatever I can to enable you to get up to speed.

Dianna Smith

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all the titles by this company)! It features watercolors of the mushrooms and great little stories, plus it's not expensive. Next is *Mushrooms of the Upper Midwest* by Teresa Marrone and Kathy Yerich (Adventure Publications, Inc.). I love this book too! It's compact but crammed full of mushrooms, great descriptions and really nice photos; also very affordable. **Both authors will be at this year's NAMA foray**! I also love *Lichens of the North Woods* by Joe Walewski, a very useful and affordable book to have. And finally I cannot leave out *Mushrooms and Macrofungi of Ohio and the Midwestern States* from The Ohio State University Press. (Of course I'm a bit biased.) Two of the authors will be on hand at the foray—Walt Sturgeon and I! And don't worry if you forgot your guidebooks, you will be able to find them at the Natural History Museum in Cable, as well as the cute little book shop. They'll be glad to see you.

The **town of Cable** has a nice grocer with most things you may need, including foods and beverages, band aids, beer and wine (this is not a "dry" event—you won't need to "sneak" this year!), snacks and fruit, assorted Wisconsin cheeses, and real honest-to-goodness freshly smoked fish right out of Lake Superior. You can also find folks selling really good smoked fish in the little town of Bayfield, on Lake Superior. Besides smoked fish, Bayfield has some nice dining and many cute shops selling all manner of items, many of them Northwoods- or nautical-themed.

Forays, flora, and fauna. **Bayfield County** is my favorite place in Wisconsin. The forests have tremendous diversity of plants and mushrooms. Here's why: the Laurentian Mixed Forest, also known as the Northwoods, is a transition zone between the true boreal forest to the north and Big Woods to the south, with characteristics of each. It has areas of both broadleaf and conifer forest cover, and bodies of water ranging from lakes to conifer bogs and swamps. Conifers include pines, spruces, firs, and junipers; deciduous types include aspens, oaks, birches, mountain ash and maples. It is often said to have a distinct smell, which is attributed partially to the presence of sweet fern.

What wildlife might you see in the Badger State? Well, it's unlikely you'll see any badgers. Or wolves (though Bayfield County is the only place I've ever seen wild wolves; it was during winter). You may see fisher or black bear, pine martin if you're really lucky as they're becoming scarce. Whitetail deer, bald eagles, and osprey are very common (look up when traveling the main route to Lakewoods and you'll spy their large nests!). Expect to hear the eerie calls of loons on the lake each morning and evening. It's truly one of the best sounds in nature!

We have many forays from which to choose and you'll see full descriptions in the program booklet you'll receive when you arrive at Lakewoods and check in. But I can give you a teaser of one of the forays I'm most excited about. NAMA forays typically feature all-day forays to really special spots. The long trip is prohibitive to most folks of course. But for those wanting to experience something unique to the area, it will definitely be worthwhile. One of our two all-day forays this year will be to **Big Bay State Park on Madeline Island**. Madeline Island, is the largest of 22 Apostle Islands in Lake Superior. The 2,350-acre park has picturesque sandstone bluffs and caves and a 1.5-mile-long sand beach. It encloses unique habitat types including lakeside dunes, sphagnum bogs, and old-growth forest. Bald eagles return annually to the park to nest and rear offspring. The park, established in 1963, has more than 9 miles of trails. All vehicles are required to purchase an admission pass. To reach the park, our foray vans will drive to Bayfield then drive onto the boat for a 20-minute ferry ride to the island. From there, it's 5 miles to the park.

Britt A. Bunyard

SMART PLANT SEEKS MEANINGFUL RELATIONSHIP WITH COMPATIBLE FUNGI

or

Hookup Apps for Cross-Kingdom Dating

by Susan Goldhor

When I was a student, biology was divided by an impermeable wall into zoology and botany, and my education took place solely in departments of zoology. Even though we were encouraged (actually, pretty much forced) to take the broadest possible view of our field, so that I took classes in physiology, biochemistry,. genetics, embryology, evolution, ecology and behavior; looking at organisms ranging from minute pond dwellers to primates (what I thought of as a "soup to nuts" view), there were two areas that were tacitly off limits. One was anything about Homo sapiens, which was regarded as the province of the ivory towered Arts section of the University, while we labored in the fields of Science; and the other was Botany which covered fungi as well as plants.

By the time I left grad school, Zoology and Botany had been melded into Biology. But nothing ever made me want to learn about plants (to say nothing of fungi). Not the fact that I had good friends who were botanists; not the fact that plants — but not animals or fungi — were capable of turning sunlight and carbon dioxide into sugars, and that all of us depended upon those carbohydrates for nutrition (even carnivores depend on plant sugars; they just get them second-hand), not the fact that I loved trees and forests; not gardening or cooking or getting interested in agriculture; none of this led me to believe that plants were worthy of my scientific interest. But recently, I've come to believe that plants are not only as interesting as animals, but that plants exhibit behaviors as complicated as that of animals.

So what changed? To a great extent the science has moved on. But what really changed for me was my fifteen years of writing columns for this small journal; the BMC Bulletin. Fungi got me interested in plants. Plants move, communicate with each other, share their bounty with their less fortunate neighbors, recognize family, friends and foes, and develop long-lasting, anatomically intimate relationships with each other but also with organisms in other kingdoms; most notably with fungi. At least some of these relationships look a lot like marriages (at least, to me), while others are clearly hookups. (Since humans like to raise barriers to same-species marriages between individuals of different colors, belief sets or national origins [amazingly, the last barrier to fall for humans is marriage between individuals who do not differ — go figure], the idea of a marriage between individuals in two different kingdoms pretty much blew my mind.)

I should make a full and open disclosure here that not all scientists think of these relationships as marriages. Whether that's a function of prejudice or superior knowledge is a question of how you view it. Or, it could just be that the word "marriage" carries a heavy emotional load for many, who insist on a narrower, more tribal view. If we said that plants and fungi form long-lasting, physically intimate relationships for mutual benefit and support, no one would demur. Think of it as you like. I do note that anthropomorphism seems to be increasingly acceptable to scientists — perhaps as a result of recognizing all that shared DNA. The learned journals have recently published papers entitled (for example), "Indifferent, affectionate, or deceitful: lifestyles and secretomes of fungi", "Symbiosis and the social network of higher plants", "Dating in the dark: How roots respond to fungal signals",and so on. To say nothing of the increasing number of botanists talking about plant neurophysiology.

I hasten to add that I do not categorize all fungus-plant relationships as marriages. Fungal pathogens and their plant prey may be intimately linked, as are criminals and victims, but if this is a marriage, it's clearly an abusive one. Similarly, those fungi that rot dead plant material do not have long-lasting mutually beneficial relationships with their source of carbohydrates, although the relationships that they do have are varied and fascinating and of tremendous ecological importance to us humans as well as to the soil that nurtures the next generation of plants. But I do regard most mycorrhizal relationships as mutually beneficial, and akin to marriages — or, at least, long-term affairs.

A "mycorrhiza", the word put together from "myco" (fungus) and "rhiza" (root) is actually a microscopic organ, formed from the joined tissues of the plant root and the fungal hypha. The hypha is the threadlike part of the fungal body as it grows underground (or through dead wood or any moist substrate), seeking water and nutrients. Although mushroom hunters think of the mushroom as the fungus, the true fungus is the hyphal mass that we call a mycelium. Think of the mold on fruit or bread left too long in the fridge — that's a mycelium. As for mushrooms, Hope Jahren, in her wonderful (and highly recommended — read it!) book, Lab Girl, wrote, "you may think a mushroom is a fungus. This is exactly like believing that a penis is a man". But much as I admire Hope, she's wrong about this. It's actually exactly like believing that a penis plus testicles is a man. The mushroom is the occasional fruiting body of the underground fungal mycelium. It's a little weird to think that fungal herbaria are full of isolated reproductive organs and nothing else, but so it is.

There are two major categories of mycorrhizal fungi: endomycorrhizal (aka arbuscular) and ectomycorrhizal. I'm only going to talk about the ectos here. First, they are the major partners of the forest trees in my region of New England, and second, only ectos (although not all ectos) produce mushrooms. Also, ectos actually exist as individual identifiable species. This is not generally true for the endos, and our ability to ID ectos by their DNA has made possible much of the research referred to in this essay.

Mycelial hyphae are much thinner than plant root hairs and far longer; so an ectomycorrhizal hypha can explore much greater areas of soil, searching for water or nutrients (or partners). Many can extrude acids to break down mineral particles and free up phosphorus, and some can extrude enzymes to break down organic matter. Some can even kill small invertebrates and digest them, absorb the nutrients freed up by these digestions and share them with their plant partners. They can do all sorts of things but there's one thing they cannot do: they cannot manufacture sugars. It's only photosynthesis which has given our planet the twin gifts of carbohydrates and free oxygen, thus making it possible for the rest of us to evolve. So when a fungal hypha meets an appropriate plant partner, it gloms onto a tiny rootlet to form a mycorrhiza, and initiates a partnership where it supplies the plant with nitrogen, phosphorus, water and micronutrients of various kinds, in exchange for sugars. There are other things going on between the plant and its fungal partners. The fungi form a communication network between plants. Both the fungal and the plant partner may provide protection to the other from a variety of enemies. Like human relationships, these are complex and constantly changing. But the first thing they have to do is to meet, and most of us (unless you met your future spouse in grade school) can attest to the difficulty of that first step. After all, we don't just want to meet anybody; we want to meet a potential partner.

This is just as true underground as above: not every fungal species affiliates with every tree species. We foragers know this without having to analyze DNA because we know that certain species of mushrooms are found only around certain species of trees, and no others. We know that Suillus species will be found in pine woods and Leccinum scabrum near birch. On the other hand,there are times when I think that *Russula* species are under everything — especially in dry years when

nothing else seems to be fruiting (although this may be my imagination). In fact, Russulas are fairly promiscuous; Lactarius being another genus that tends to hook up pretty widely. We know that oaks host a variety of mushrooms but that there's no point searching a grove of maples, ash or sycamores, since they have mycorrhizal partners that are endos but not ectos. So it's not simply that fungal hyphae happen to encounter tree roots; as in any singles bar, the trees are telling the fungi where to search; the fungi are searching while advertising their presence, and each is signaling as to whether it's a desirable partner. Think of it as Tinder for trees. (Maybe we could call it "Timber".) We're just starting to understand how these two kingdoms talk to each other, so we don't know each species' signals, but we have learned some general social media type messages. For example, one such fungal signal (but not for all fungi) are the volatile organic compounds in the class of sesquiterpenes which cause the plant to respond by putting out extra lateral roots. And we've also learned that fungi that are highly selective about their trees utilize different hookup mechanisms than those that are promiscuous. Just like people.

And here we must insert a little fact about these "marriages". There are a few (very very few) fungal species that are faithful to one tree host type. There are no tree species that have a monogamous relationship with any one fungus. Take the alder genus. Their fungal associates are all specific to alder, but alders don't limit themselves to just one of these faithful partners. (They do, however, stick within these associates which makes them unique.) And, contrary to what you might think, these fungal partners of alder are evolutionarily diverse. In contrast, while the entire genus of Suillus is specific to pines and their relations in the Pinaceae, these trees don't limit themselves to Suillus, but affiliate with lots of more generalist fungal species.

Since at least a few fungi are more faithful to their plant hosts than vice versa, it's interesting to ask how they do it and what the benefits are. At least some Suillus species, and also a closely related genus, Rhizopogon, have spores that are long lasting in soil (Rhizopogon spores have been shown to survive forest fires, when very little else does) and are stimulated to germinate by diffusible compounds released by pine roots and only by pine roots. However, when these fungal specialists are not in spore form but are mycelial, growing around and searching, they will occasionally try to initiate mycorrhization with the wrong tree. For example, Suillus grevillei, which specializes in larches, has been observed trying to mycorrhize with a pine or Douglas fir only to be repelled by quickly manufactured phenolics in the chosen root. What a slap on the hypha! Trees know which partners they want. As to the benefits of specialization, when Suillus species connect with the appropriate tree, the roots they mycorrhize enlarge, leading us to believe that these specialized fungal partners are getting more sugar than the generalists. (All those carbs are probably what allows Suillus to produce lots of fruit bodies.) Whether this is a bad bargain for the tree or whether Suillus pays for those extra sugars with extra goodies from its own foraging, is unknown. But even if it's a bad bargain, since Suillus tends to colonize just a small proportion of the tree's root tips, the tree is free to seek more generous partners on the rest of its root system, thus enjoying, penalty-free, what so many humans can only dream of.

Suillus may enlarge its host's roots but all ectomycorrhizal fungi change the structure of the roots they colonize. The fungus forms a sheath that reduces the rate of cell division and suppresses the development of root hairs. Essentially, this eliminates the plants's ability to forage and means that all its nutrients must come through the fungal partner. ("Don't you worry about a thing, sweetie — I'll take care of you.")

In thinking about these aspects of Botanical Big Love, it's helpful to picture the root structure of a big tree. Just in physical terms it would be difficult for one fungal mycelium to associate with all of those rootlets. But in physiological terms, there's another reason for plants to want multiple fungal

partners, and this is that different fungi offer different benefits. Since these experiments are really difficult fungal partners, and this is that different fungi offer different benefits. Since these experiments are really difficult to carry out, we don't know all of the benefits that each fungal species offers, but we do know a few. For example, Laccaria bicolor has a snake-like venom with which it kills springtails; those minute and ubiquitous insects. After digesting them, it shares the nitrogen (plants need N-P-K just like it says on fertilizer packages) with its tree partners. Who wouldn't want this partner? Suillus forms enormous mycelia; we don't know for sure, but maybe it's a good forager for phosphorus and water. At least one species (S. variegatus) is skilled at breaking protein molecules into smaller bits, easier to absorb. On the other hand, Russulas form hardly any mycelia. Plus, they hand out some of the sugars they receive to their parasitic Indian Pipe pals. Are they freeloaders? Or are they good at protecting their hosts from predators and/or diseases? If it's the latter, it's understandable that almost everyone is willing to spare them some rootlets.

What's sauce for the goose is sauce for the gander. Trees aren't the only partner covering a lot of underground territory and looking for multiple hookups. Bruns et al. write, "both plants and fungi have large parts of their thalli that are not associated directly with their partner and are free to simultaneously associate with other unrelated hosts. This arrangement means that individual fungi can be simultaneously associated with several plants and that individual plants can be simultaneously associated with multiple fungi. In addition, both plants and fungi disperse independently (i.e., horizontally). These latter features mean that the fates of the mutualistic partners are not tightly linked; each is free to try to optimize the interaction in a selfish way. This is predicted to lead to low specificity, and possibly cheating."

There are two fascinating phenomena that emerge directly from the complex interactive nets formed by the fungal-plant hookups in the forest. One is what has been cleverly and accurately termed "the wood-wide web"; a way to exchange messages and carbon between trees (and between trees and other plants), using the fungal network as carriers. The www acts as a social safety net, with the bigger trees contributing sugar to the smaller ones, down in the understory with insufficient light for photosynthesis. And the other phenomenon, more relevant to our study of intimate relationships (frankly, with the fungus literally penetrating the root, inserting itself between cells and —finally — wrapping itself around the root, this relationship is really intimate) is that of cheating.

Anyone who's read novels about human relationships (it's tedious, but almost all novelists seem limited to describing their own species) will recognize that adultery is at the root of a great many romances, classic and otherwise. At some level, we can probably consider these plots mycorrhizal. But who can forget Anna Karenina throwing herself in front of a train, or Madame Bovary dying hideously of arsenic? (An article in the New Yorker claims Flaubert "is said to have vomited at the dinner table two nights in a row after writing this scene" and my memory of Emma's death is in line with that. I've never wanted to reread this book.) Just for being unfaithful! To boring husbands! Surely tree-fungus relationships are more civilized than this. Well . . . sometimes.

First of all, what constitutes cheating in a mycorrhizal relationship? We already know that it's extremely rare for a fungal partner to limit itself to a single species of tree, and it's unheard of for trees to limit themselves to a single fungal species. Promiscuity here is the rule; it's healthier. When we talk about marriages, we're talking about individual mycorrhizas and even those are not permanent although ectomycorrhizas may last more than a year — a long time in the evanescent world of hyphae and root hairs. (Endomycorrhizas have a lifetime of days.) Each mycorrhiza is a tiny partnership, exchanging nutrients, water, protective compounds and signals. A tree in the forest may have thousands of mycorrhized rootlets formed with multiple species of fungi. (The Canadian mycologist, David Malloch, has pointed out the contrast between the relatively small number

of trees species in our northeastern woodlands and the thousands of species of ectomycorrhizal fungi underground, affiliated with those trees.) And sometimes, life being what it is, one fungal partner will try to cheat. Cheating in mycorrhizal terms means not sticking to the terms of one's bargain. For example, keeping all the phosphorus (or nitrogen, or whatever) for one's self instead of giving a fair proportion to one's partner. (And remember that the fungal partner is wrapping up the plant root in such a way that it can't forage for itself.) Evolution is always pushing partners towards cheating. Mutualistic symbionts are always edging towards parasitism. However, this evolutionary trend has a safety valve — if it didn't, partnerships and communities would collapse. The safety valve is that if one partner has the ability to cheat, the other partner has to have the ability to impose sanctions on the cheater. Think about international agreements. Think spy-counterspy. If one fungal partner doesn't hand over whatever it's supposed to deliver, the tree cuts off sugars to that fungus. Yes! The tree knows what's happening in its mycorrhizas! It can impose sanctions, which is another way of saying that the tree divorces that fungus — without alimony! Sometimes, since plants can be violent, the divorce can be lethal for the cheater. In at least one case that was investigated, the tree had been giving the fungus defensive chemicals as well as sugars. When these were withdrawn, the tender, nutritious, and now defenseless hypha was gobbled up by soil invertebrates. Sometimes I feel that the mycorrhizal net is just waiting for its Flaubert.

It's a revelation to me — a zoologist — that plants can choose their partners, carry out complex relationships with a great number of partners, make ongoing adjustments to what each receives, and divorce those partners who fail to deliver. As to the fungal half of these partnerships, I guess I'm less surprised. After all, fungi are genetically closer to animals than they are to plants. I've been looking at the multiplicity of amazing fungal behaviors for years. But the fungi have just recently opened my eyes to the plants, and now that they're open, I see wonders. This is an exciting time to be a biologist, all kingdoms included, and the most exciting bits are the places where the kingdoms meet and marry. Or at least hook up.

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World's oldest fossil mushroom found

Roughly 115 million years ago, when the ancient supercontinent Gondwana was breaking apart, a mushroom fell into a river and began an improbable journey. Its ultimate fate as a mineralized fossil preserved in limestone in northeast Brazil makes it a scientific wonder, scientists report in the journal PLOS ONE.

The mushroom somehow made its way into a highly saline lagoon, sank through the stratified layers of salty water and was covered in layer upon layer of fine sediments. In time -- lots of it -- the mushroom was mineralized, its tissues replaced by pyrite (fool's gold), which later transformed into the mineral goethite, the researchers report.

"Most mushrooms grow and are gone within a few days," said Illinois Natural History Survey paleontologist Sam Heads, who discovered the mushroom when digitizing a collection of fossils from the Crato Formation of Brazil. "The fact that this mushroom was preserved at all is just astonishing.

"When you think about it, the chances of this thing being here -- the hurdles it had to overcome to get from where it was growing into the lagoon, be mineralized and preserved for 115 million years -- have to be minuscule," he said.

The mushroom was uncovered in the Araripe Basin, in northeast Brazil, in a limestone layer called the Crato Formation.Credit: Graphic by Danielle Ruffatto

Before this discovery, the oldest fossil mushrooms found had been preserved in amber, said INHS mycologist Andrew Miller, a co-author of the new report. The next oldest mushroom fossils, found in amber in Southeast Asia, date to about 99 million years ago, he said.

"They were enveloped by a sticky tree resin and preserved as the resin fossilized, forming amber," Heads said. "This is a much more likely scenario for the preservation of a mushroom, since resin falling from a tree directly onto the forest floor could readily preserve specimens. This certainly seems to have been the case, given the mushroom fossil record to date."

The mushroom was about 5 centimeters (2 inches) tall. Electron microscopy revealed that it had gills under its cap, rather than pores or teeth, structures that release spores and that can aid in identifying species.

"Fungi evolved before land plants and are responsible for the transition of plants from an aquatic to a terrestrial environment," Miller said. "Associations formed between the fungal hyphae and plant roots. The fungi shuttled water and nutrients to the plants, which enabled land plants to adapt to a dry, nutrient-poor soil, and the plants fed sugars to the fungi through photosynthesis. This association still exists today."

The researchers place the mushroom in the Agaricales order and have named it *Gondwanagaricites magnificus*

University of Illinois at Urbana-Champaign. "World's oldest fossil mushroom found." *ScienceDaily*. 7 June 2017. www.sciencedaily.com/releases/2017/06/170607141349.htm.

WHACKED OUT MYCOLOGY

By Larry Millman

To find out how fungi can save the world or, if not the world, at least certain peoples' bank accounts, I recently attended the 1st Annual Whacked Out Mycology Convergence in East Dementia, Connecticut.

The Convergence was packed, which is not really surprising, given that Whacked Out Mycology is becoming an increasingly popular phenomenon. Indeed, *Bloody Flux News*, a division of Fox News, filmed all the events, starting with the initial hug-in, where mycophiles and their favorite fungi embrace each other.

Here's a list of some of the presenters and their topics:

— The opening address was given by a Wall Street mycophile, who boasted that fungal futures have never been higher. He illustrated this fact with a cladogram.

— A woman from a company called Egovative talked about how ego-based mycelia can be used to upholster upper middle class vacation homes. These same mycelia can also digest scientific scrutiny, she added.

— A vegan mycophile (he looked like a severed head mounted on a pike) told us that his diet consisted only of shiitakes and the occasional amanita. "I've had only four liver transplants," he declared.

— An alcoholic mycophile discussed the medicinal benefits of vodka-infused chaga. These benefits are vastly superior to non-infused chaga, he informed us.

— An employee of Fungi Impeccable, Limited, told us that extracts from certain polypores can cure cancer as long as a person doesn't have it. Like-wise, he said that his company's ergot capsules can boost our immune systems dramatically by giving us spasms, convulsions, and gangrene.

— The founder of Stinkhorn Medicinals discussed the use of *Phallus impudicus* as a cure for erectile dysfunction. Uncircumcised men should use the so-called Veiled Stinkhorn, *Dictyophora duplicata*, he added.

— Cigarette butts are an excellent fungal substrate, another speaker said, and can readily host so-called butt rotting pathogens like *Phaeolus schweinitzii* and *Serpula himantioides*, thus preserving forests for human use.

— One of the presenters observed that when "shit happens", you can use it as a substrate for growing Psilocybes. In fact, he was selling his own book (its title: *Give Me Shit*!) on the subject.

— Speaking of psilocybes, another presenter recommended their use as an aid to mycoremediation. What's the best method for doing this? Well, you distribute them to students in remedial learning classes.

— A mycophile with superior misidentification talents (at other fungal events, he was permitted only to set up and take down tables) showed us how to grow oysters and illustrated his presentation with specimens of certain saltwater bi-valves.

—`A voice teacher talked about how fungi will give us their binomials if we sing their favorite songs to them. For instance, most agarics like country rock singer Vince Gill and bossa nova vocalist Gilberto Gil, although amanitas seem to prefer Death Metal.

— In the convergence's keynote address, Whacked Out's founder offered us this radical idea: that fungi came originally from Outer Space, crashing into our planet in a UFO (Unidentified Fungal Object) captained by a somewhat tipsy maitake. Or maybe it was a tipsy reishi mushroom, he wasn't quite sure.

But whichever species was at that errant spaceship's helm, I highly recommend next year's Whacked Out Mycology Convergence to anyone who wants to learn less about fungi than he or she already knows.

FUNGI NEWS

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Hello Beautiful People!
An Update on the Samuel Ristich Papers

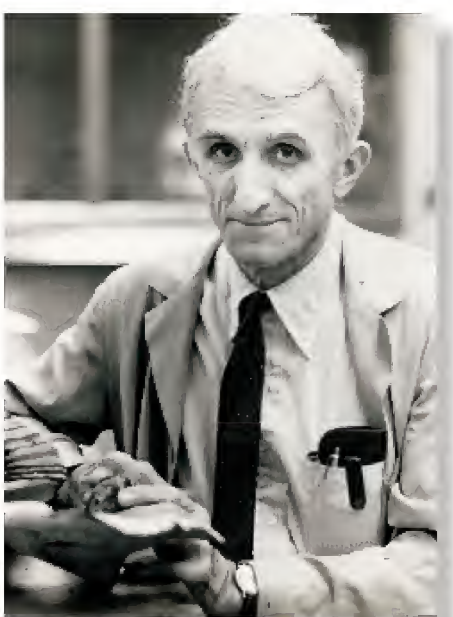
by David Rose

What do you do with boxes of old notebooks, index cards, and other such analog records in a digital age? Scan them? Possibly. But what if there are thousands, even tens of thousands of documents, along with carousels of photographic slides? Do you stash them up in the attic with the aging scrapbooks? How about down in the basement or in the garage? Forget about them? Discard them? What if these records were created by the renowned "Mushroom Guru of Sligo Road," Dr. Samuel Ristich?

In that case, the answer is obvious: you preserve the original records lovingly in archival folders and boxes and maintain them in a permanent collection. It has been my privilege to have spent the past several years doing just that – organizing the records of one of the most beloved mycologists of the 20th century: Sam Ristich. With the encouragement of the Ristich family and the support of the mycological community, this marvelous archival project is in its final stages, with Sam's collection eventually to be available to anyone interested in researching the history of American mycology of the half-century just past.

Samuel S. Ristich, Ph.D. (1915-2008) was an entomologist, mycologist, and science educator whose professional career as a research scientist for ER Squibb and the Boyce Thompson Institute for Plant Research preceded a long post-retirement career as an educator in mycology. Sam inspired the creation of three mycological associations (Maine, New Jersey, Connecticut-Westchester), and his personal magnetism, breadth of knowledge, and boundless enthusiasm were legendary. In 1979, Dr. Ristich received the NAMA Award for Outstanding Contributions to Amateur Mycology, and in 1981 the Northeast Mycological Federation named its annual mushroom foray in his honor as the Samuel Ristich Foray. His profound influence as a caring educator and "deep steward" of Planet Earth still resonates almost a decade after his death.

Organizing Sam's life's work – a colossal collection of papers, correspondence, photos, and artwork – presented unique challenges. Boxes of documents were transferred in stages from Maine to my home in New York, while slides and photos were transferred to fellow Ristichian Jerry Sheine in Michigan for digitization. Opening any box of this precious material was almost like hearing Sam himself shout "Hallelujah!" upon finding a slime mold traipsing on a stump. Sam was a mycologist but not quite an archivist – his penchant for using adhesive tape (even duct tape!) posed a constant problem in separating fragile documents. In opening any file folder of Sam's, one might be treated to his fascinating writings on galls or polypores, but one might also literally encounter a shower of wood debris, spores, desiccated fungi, feathers, deceased insects (pulverized or not), dust, dirt, fuzz, hair – all the magnificent detritus of a working field mycologist. And Sam saved everything, from boyhood records of bird sightings in the 1930s in Aliquippa, PA to email print-outs of correspondence with friends from his final years at his home on Sligo Road.



Sam Ristich at Boyce Thompson Institute, 1974

What do the Samuel Ristich Papers contain? The completed collection includes Sam's original notebooks, manuscripts, correspondence, personal papers, spore print art, photography, clippings, and subject files on hundreds of science topics. Sam supported the mycological community in countless ways, one of which was subscribing to dozens of newsletters, and these local publications (some of them difficult to find elsewhere) are well-represented in the collection. His career in pest control science, his effusions over *é*, advice to the entomophobic, the history of *Amanita ristichii*, the first drafts of *Sam's Corner*, his service in toxicology and poison control, his fascination with myxomycetes and hyper-parasites, not to mention his environmental and civil rights activism are documented in wildly abundant detail covering a span of eighty years. Of special interest outside the field of mycology are documents relating to his participation in an environmental study of the Hudson River and a project on seeds in collaboration with Carol Levine. A repository for the collection has yet to be selected; when that occurs a follow-up announcement will be made in *The Mycophile* and a finding guide to the collection will be made available.

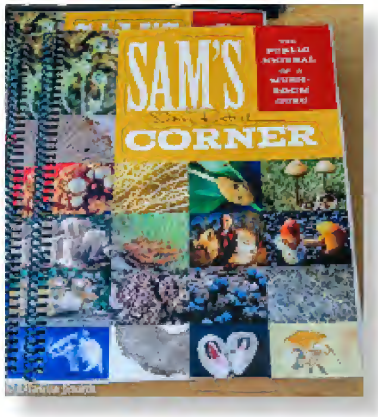
As an archivist I have worked on many projects to organize and preserve collections of scientific records, including those of the North American Mycological Association now housed at the NY Botanical Garden. However, my encounter with Sam was life-changing (countless others have said the same), and the project of working on his personal papers has been rewarding and enlightening beyond compare. The Samuel Ristich Papers are a unique and irreplaceable collection of mycological and entomological records. Those who knew Sam are familiar with the accolades he received for his inspirational lessons into the luscious minutiae of Nature. It's gratifying to know he was well-appreciated during his lifetime. Gary Lincoff said it best – Sam's perspective was one of "radical amazement." Sam supplied us with eyes to see the luminous details that others might not notice and fresh insight for the re-enchantment of the world. He often opened his lectures with the sensational greeting "Hello, Beautiful People!" and it is my personal pleasure to acknowledge the many beautiful, dedicated people who assisted with this project.

The original advisors to the Ristich archive project were Ursula Hoffmann, Carol Levine, Gary Lincoff, Andrea Masters, Jodee Ristich, Ruthie Ristich, and Jerry and Sandy Sheine. I happily single out Sandy Sheine as a special friend, mentor, and original instigator into all things Ristichian. Sandy took me and my family under her wing when we were first learning our species in the 1990s, and I will never forget her insistent words: "You must meet Doctor Ristich!" My gratitude to Sandy is without limit, and the same applies to her husband Jerry, who had a critical role in creating digital scans of Sam's photos and slides as he has done for several other mycological projects. I had never met Sam's daughters Ruthie and Jodee until this project began, but they have now also become special friends. Their interest, advice, friendship, and generosity has been invaluable every step of the way. Ruthie Ristich has been especially supportive with guidance and information about the Ristich family and personal memories of her father.

Several mycologists have donated their own collections of correspondence they received from Sam to add to this archival collection. Think of what this means! It means parting with original, cherished letters from Sam in order to enhance the larger collection. There is no question but that this was a generous sacrifice that will be appreciated by future Sam Ristich fans for years to come. Such original correspondence was donated to the Ristich Archive by Lance Biechele, Susan Hopkins, Carol Levine, Roz Lowen, Michaeline Mulvey, Maggie Rogers, Monica Russo, Sandy Sheine, Terry Stoleson, Rod Tulloss, and Bill Yule. In several cases these were sizeable collections of hundreds of documents. For this, many thanks!

Finally, monetary donations for the purchase of archival supplies essential for the proper housing of

paper documents and photographic prints were made by Evelyn Archibald, Susan Hopkins, Ed and Georgia Pearson, Walter and Mary Plant, Rick Van de Poll, and by the following organizations: Boston Mycological Club, Cercle des Mycologues de Montréal, Connecticut-Westchester Mycological Association, Eastern Pennsylvania Mushroom Club, Long Island Mycological Club, Mid-Hudson Mycological Club, Montshire Mycological Club, New Hampshire Mycological Society, North Yarmouth Conservation Commission, and Western Pennsylvania Mushroom Club. Hopefully I have not overlooked any whose contribution should be so acknowledged. Thanks to one and all.



President's Message

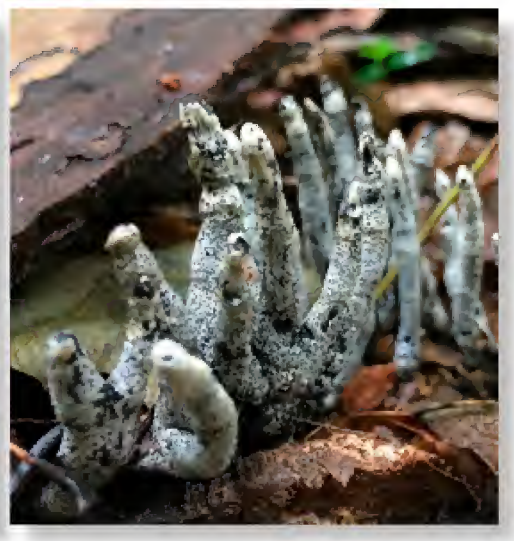
By David Rust

The Northwoods foray is nearly upon us: September 7-10. I've never hunted mushrooms in the Midwest, even though I grew up there. With full NAMA registration and bountiful rains, it should be a blast! I'm sure Britt Bunyard will make an exciting event for all who attend!

Debbie Viess and I had an opportunity last month to participate in (my very first) Northeast Mycological Federation (NEMF) foray, at Stratton Mountain, Vermont. In case you didn't know, NEMF is a group of about 20 mushroom clubs, based in the Northeast United States. The woods in Vermont are very different from, say, Virginia. I didn't know the trees, and I didn't know the mushrooms. I learned a lot and enjoyed all the folks at the event, many of whom are NAMA members, including NEMF President Dianna Smith!

Leotia lubrica (cluster)

Cortinarius corrugatus, with slugs



Xylaria hypoxylon (anamorph stage)

This event hosted many wonderful presenters, including folks familiar to NAMA members: Roy Halling, Rick Van de Poll, Terry Delaney, Dorothy Smullen, Gary Lincoff, Renée LeBeuf, Roz Lowen, John Plischke III, and more. The mycophagy presentation by Joe and Kathy Brandt (and a host of others) was spectacular! You can see more photos and info at: http://nemf.org/index.html.

Here's a group photo on one of our Stratton Mountain forays (Dianna Smith seated in front with blue shirt). You might recognize Debbie Viess, Terry Delaney, Sam Landes, Richard Jacob and Joel Horman in the back row:

Speaking of Dianna Smith, this is her last issue of *The Mycophile*. When she took over as Editor in January 2012, the newsletter immediately took on a new professional look, content dramatically improved, and articles filled 24 pages each issue. I can't say "thank you" enough times. Dianna, you've done a terrific job for 6 years. Thank you for an **amazing** run!!

The North American Mycoflora Project (http://northamericanmycoflora.org), launched in 2012, got a boost this year from Bill Sheehan, who organized a presentation and workshop at the Mycological Society of America annual meeting in mid-July in Athens, Georgia. The MSA Liaison with Amateur Clubs Committee (NAMA's Mycoflora Committee Chair Steve Russell is the new student representative on this group) is developing a uniform set protocols for vouchering. I would like to keep NAMA involved in this process and have us take a strong role in promotion, fundraising and coordination.

The Mycological Society of America just voted to create a $20,000 matching fund for DNA sequencing. We need a plan to take advantage and participate in this effort. At this time, Dr. Todd Osmundson's (https://www.uwlax.edu/profile/tosmundson/) lab at UW-LaCrosse will contribute equipment and labor for lab work and data processing, with Dr. Rytas Vilgalys' lab possibly handling sequencing as well. You'll be hearing a lot more about this project and how to get involved in the near future.

NAMA Needs You! Several key positions are still open. If you'd like to help NAMA by participating with a committee or leadership role, please contact me at president@namyco.org or call me at 510.468.5014.

NAMA White Mountains Regional Foray

By David Rust

Anyone who thinks “Arizona” and equates the word with “desert” and “hot” hasn’t visited the area where the first Arizona White Mountain Regional Foray was held in mid-August. Sunrise Park Resort served as an excellent base of operations. This is Apache country. Our lodge was on the reservation – almost all our mushroom forays were deep in the Apache-Sitgreaves National Forest. Two weeks of monsoon rains brought out a lot of fungi, in all the various habitats: spruce/fir forests, ponderosa/oak/aspen, and pinyon/juniper/manzanita.

Boletus barrowsii buttons

Fabian Monje with basket of *Boletus rubriceps*

Witches butter

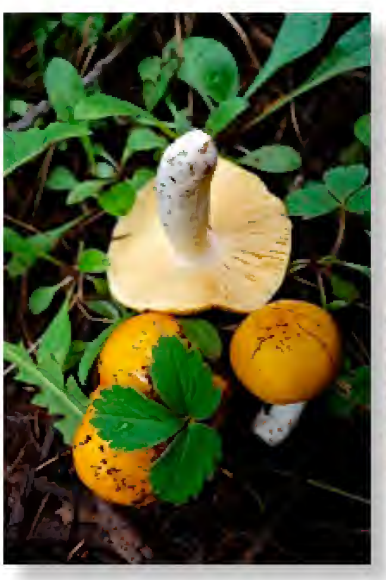
Dr. Chris May, who has resurrected the Arizona Mushroom Society, arranged a terrific experience for about 70 attendees, with workshops on identification, cultivation, mycophagy, and microscopy, and the genus *Agaricus*. In the evenings, we were treated to presentations by Dr. Scott Bates and Dr. Rick Kerrigan. Bates has done extensive study of macrofungi in the Southwest, and Kerrigan has found several new *Agaricus* species there. Assisting with mushroom identification was AMS member Terri Clements, and Southwest fungal aficionado Bob Chapman. Faculty included Mary Smiley, who did a mushroom cooking demo, and Clinton White, Symbiotic Farms, who presented a workshop on Arid Climate Cultivation.

Our first foray to Lee Valley Lake - Arizona’s highest elevation reservoir at 9,420 feet - felt like a trip into the distant past: rolling meadows, undisturbed spruce/fir forest, mushrooms everywhere. In the parking lot, we were greeted with a notice that Mexican grey wolves had been reintroduced to this area. Despite hunting for the diverse fungi of the area, it was hard for participants to ignore an abundance of edible boletes, in particular *Boletus rubriceps* (quickly adopted by locals and changed to “Rubies” as a legit common name).

To see Hugh Smith’s many photos from the foray visit: https://goo.gl/photos/rPErXfUnrQTF581EA.

Lee Valley Lake Foray, photo by Hugh Smith

On other walks we found an array of amanitas in the grisette group: copper, grey, tin-colored and even pink. Delicate grey wood ears were often seen on downed conifer branches. Clusters of pholiotas popped out of the base of aspens. In other areas, folks found lots of *Boletus barrowsii*, named after famed Southwest mycologist Chuck Barrows of the New Mexico Mycological Society.



Russula lutea

Agaricus didymus

Copper grisette

© Photos by Debbie Viess

For most folks coming from out of area, the elevation took some adjustment. Yes, at times, it was hard to breathe. As BAMS member Hugh Smith noted, just the simple act of tying one's shoes could cause dizziness… same for repeatedly bending over to pick a mushroom, setting up a photo, etc.

Rain was on our minds every day. In monsoon season, at 9,200 feet elevation (and higher), huge cumulus clouds develop daily. When we were out in the forest, we were on alert for the first flashes of lightning, and the timing of thunder (one thousand one, one thousand two…). When thunder sounded less than 5 miles away, we moved quickly to the cars and got out of the area. These storms release torrential rain (and hail) in a short time, and, as we witnessed at Sunrise Lake, lightning strikes were fast and furious.

Chris May, Rick Kerrigan, Scott Bates, David Rust at Sunrise Park Resort
(thanks to Michelle from the San Diego Mycological Society for taking this photo!)

This was the first new NAMA regional foray in years. Many thanks to all who worked to make it happen, including Chris May, Lisa Goodwin, Bill Warner, Terri Clements, and Sam Landes, NAMA Foray Committee Chair.

Perfect specimen of *Pleurotus dryinus* on log

Bright Yellow Russulas

(Madera Canyon, Santa Rita Mountains)

It was nice connecting with so many mushroom people. There was a good-sized contingent from California, with many members of my club, the Bay Area Mycological Society, and a group from San Diego, including club vice president Les Braund, with whom I shared a bighorn sheep sighting in Anza Borrego State Park a couple years ago.

Finally, it goes without saying that any story about Arizona has to include at least a couple photos of cacti. Here you are. These were taken along Highway 79 on the way from Phoenix to Tuscon.

Saguaro Cactus (15 feet tall)

Barrel Cactus

Ocotillo shrub

Coltricia montagnei

By John Dawson

Coltricia montagnei (Fries) Murrill is an uncommon but distinctive terrestrial polypore, whose pores, as described in Bessettes' and Fischer's *Mushrooms of Northeastern North America* are "angular and radially elongated near the stalk", but form "conspicuously concentric gill-like plates toward the margin". It fruits under hardwoods from July to October. The epithet 'montagnei' honors Jean Pierre Francois Camille Montagne, a French military surgeon who, after retiring from the French army at age 48, devoted the rest of his life to the study of cryptogamic botany (mosses, algae, lichens, and fungi).

Montagne was born at Vaudoy en Seine et Marne on February 15, 1784. When he was just eight years old his father, an obstetric surgeon, died of typhus, and at age 14 young Jean Pierre enlisted in the marines. He participated in Napoleon's Egyptian campaign, and after the fall of Alexandria in 1802 he returned to France and began medical studies in Paris. It was there that his interest in botany was awakened, through contact with professors from the natural history museum.

In 1804 Montagne entered the military health service, serving first at a military hospital in Boulogne-sur-Mer and later in Italy, where he attained the rank of surgeon major. In 1815 he became leader of the health service within the Royal Army, but was captured by the Germans and imprisoned for a year. He then returned to Paris, and rejoined the army three years later. He served for a time with a regiment at Saint-Omer, where he met a doctor who was engaged in the study of cryptogams. Thereafter Montagne pursued field studies in botany in parallel with his military duties.

Montagne was subsequently deployed to Spain, and was awarded the légion d'honneur for his service there in the battle of Pampelune. He then traveled around France, ending up as director of the military hospital in Sedan, where he worked from 1830 until his retirement in 1832.

During his military service Montagne came into contact with many naturalists with whom he later corresponded on botanical matters. As a result of his broad knowledge of languages, his collecting, and his publications in scientific journals (especially the Annales des science naturelle) he became widely known both within and outside of France, and was elected a member of the French Academy of Sciences in 1853.

With his British contemporary Miles Joseph Berkeley, Montagne is regarded as a pioneer in the study of fungi from what were then considered "exotic" locales, such as Algeria, Brazil, Chile, and North America. He is also regarded as a precursor of the field of plant pathology, on the basis of his discovery of the potato blight fungus *Phytophthora infestans* and his studies of fungal pathogens of nut trees. He contributed to various important botanical works, including *Flora Chilena*, *Exploration scientifique de l'Algérie*, and Charles d'Orbigny's *Dictionnaire d'Histoire Naturelle*, and in 1856 published a compilation *Sylloge Plantarum Cryptogamarum* of the descriptions he had given of 100 new genera and 1700 new species of cryptogams.

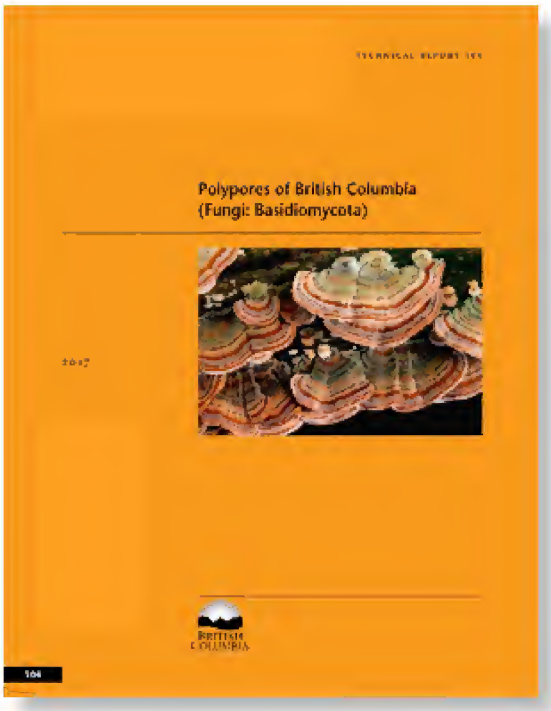
Montagne suffered a crippling stroke in 1860 and died of another on December 5, 1866.

J.P.F.C. Montagne (by P. Heriveau)

Final note: Formerly, *Coltricia montagnei* was known as *Coltricia montagnei var. greenei, Cyclomyces greenei,* and *Green's polypore* — all involving a second eponym for someone named Green(e). In Ron Myers's myco-etymological dictionary it is speculated that the individual in question may have been the early American botanist Benjamin Daniel Greene, about whom interested readers may consult the quaintly amusing obituary by Asa Gray that appeared on p. 449 of the *American Journal of Science and Arts*, ser. 2, vol. xxxv (1863).

Sources: Information in this article is taken from the entry on Montagne in the German reference work *Die Geschichte der Mykologie* [*The History of Mycology*] by Heinrich Dörfelt and Heine Heklau, and from the online source http://botanique.univ-lille2.fr/fr/l-herbier-de-la-faculte/l-herbier-historique/montagne-camille-jean-pierre-francois.html (in French)

Polypores of British Columbia (Fungi: Basidiomycota)



Technical Report 104, Province of British Columbia (Ministry of Forests, Lands, Natural Resource Operations & Rural Development), 2017

James Ginns

ISBN: 978-0-7726-7053-3 (paper, spiral-bound) / 978-0-7726-7054-0 (digital) / ix + 260 pages

Price: CAN $67.78 (print-on-demand). Order from https://www.crownpub.bc.ca/ (search "polypores" or "7680003560" [the product number] in their online catalog). PDF available for free download at https://www.for.gov.bc.ca/hfd/pubs/docs/TR/TR104.pdf.

Few polypores generate great interest among most mushroom hunters and so they usually are rather poorly represented in field guides (for instance, they comprise only 21 of the 465 species in *Mushrooms of the Pacific Northwest*). Not many are strikingly attractive, their stature and manner of fruiting make them difficult photographic subjects, and only a handful can be considered good edibles. So they get little respect, despite their great ecological importance as decomposers, pathogens, and ectomycorrhizal symbionts, and their lack of presence in field guides means they are difficult to identify for the folks who do take an interest in them. There is, of course, the technical treatment, *North American Polypores*, by the late Bob Gilbertson and Norwegian polypore expert Leif Ryvarden, but it is out of print and its lack photographs or other macro illustrations of the fruiting bodies is a major limitation for most of us (it is, however, loaded with drawings of microscopic features). Thus, for wannabe polypore identifiers, this new book by Canadian wood-rotter expert, Jim Ginns, will be most useful, not only in BC and the US Pacific Northwest, but farther afield, as well.

After a few pages of Abstract, Acknowledgments, and Photographic Credits, Ginns provides a brief Introduction (Purpose, Scope, Effect on Wood, Cultural Significance, Economic Impact, and Ecological Impact), an equally brief section How to Use this Report (Collecting, Microscopic Study, Identification, and Standard Format for Descriptions, followed by seven pages of excellent line drawings by Ryvarden), and a short summary of the current taxonomic arrangement of the polypores, noting that it is not the final word by any means. The back matter includes Glossary and Abbreviations, References (mostly to primary research sources), and the Index.

The meat of the book begins with a series of six keys (A through F) to genera and selected species, preceded by a key to those keys (which, at first somewhat confusingly, does not include key F — to which one is directed by three different leads in key B). The A-through-F key groups are based on presence/absence of a stipe, presence/absence of a cap, substrate, and color of the context. The keys (A through F, as well as the many keys to species that appear in the Descriptions section) include microscopic features, such as the nature of the hyphae, presence/absence of clamp connections, and spore size and shape so, while not always absolutely necessary, a microscope will come in very handy.

The Descriptions of Genera (83) and Species (207, about 42% of the currently recognized North American species) are arranged alphabetically and follow a standardized format. For genera with more than one species in BC, a genus description and key to the species precede the species descriptions. The standard format includes Current Scientific Name, Synonyms, Common (English) Name(s), Habitat, Geographic Range, and Description of the Basidiomata (Ginns uses technical terms throughout), first the macroscopic characteristics and then the microscopic ones, and each concludes with Notes that highlight distinguishing features and compare the species in question with similar ones. Although no photographs are provided for some species (less common, or less commonly noticed ones), most of the descriptions are supported by one or two photos, often a combination of overall aspect and hymenium close-up views.

The descriptions are well done. A major focus of Ginns's professional career has been the study of wood-rot fungi (not just the polypores), which has given him an excellent personal familiarity with most of the species and this is clear in his writing. He includes sufficient detail for identification purposes while, at the same time, being clear and concise. The photographs, most of which are about 2 × 3 inches or somewhat larger, are of uneven quality and few of them are what I would consider excellent. Part of the reason is that most polypores make poor subjects. Their typical shelf-like shapes make it difficult to show both the upper and lower surfaces simultaneously in an undisturbed shot and the sides of logs and snags don't provide much of a platform for up-turning one shelf to exhibit the pore surface. Many of the photos are rather dark, and comparison of the print and PDF versions suggests that, although the printing process was responsible for much of the problem, some of the original images likely were under-exposed. Nevertheless, the quality is sufficient for identification purposes.

While I think the content is spot-on, I dislike the large amount of wasted space in the layout of the book. It is large-format (8.5 × 11 inches, which is great), but the space is not utilized effectively. The left margin is nearly 3 inches wide and, in most cases, it is only used for the species name(s) and synonyms. Occasionally a photo also extends into this area. There also are many pages where large areas of white space are left at the bottoms. Using more typical margins and avoiding excess white space would have allowed the size of the photos to be increased considerably (thus increasing their utility) without adding to the page count.

In addition to providing a new tool for those mushroom hunters who are already polypore fans, I hope this book encourages other folks to learn more of these ecologically vital fungi. The print-on-demand version is competitively priced, while the free PDF is clearly a bargain. Kudos to the Provincial government for making the digital version freely available.

Steve Trudell

NAMA Foray Participants! As you're making plans to attend the upcoming Northwoods NAMA foray, please consider looking through your books, t-shirts, tchotchkes and other mushroom related items for donations to the ever-popular Silent Auction. Not only will your items find an appreciative new home, but you will be contributing towards the endowment fund, which supports the NAMA memorial fellowship. Last year your generosity helped raise $1,747 for the endowment fund!

***Daedaleopsis confragosa* (Bolton) J. Schröt.**
Thin-walled maze polypore

Habitat/range: On hardwoods, especially *Salix* and *Betula* species, causing a white rot. Widespread in the southern third of BC and in the Prince George area. Elsewhere in western North America, known from YT, AB, WA, MT, AZ, and NM.

Basidiomata variable, sessile or reflexed, sometimes imbricate; **pileus** dimidiate, 2–10 cm wide × 3–15 cm long × 0.5–5 cm thick, tough, corky; **pileus surface** variable grey, beige, brown, nearly black, soft-velvety to glabrous; **context** up to 2.5 cm thick, pale buff to brown, leathery, zonate; **tubes** tinted pale pink, up to 2.5 cm deep; **pore and lamellae surfaces** whitish, beige to pale brown; **lamellae** buff to pale brown; **pores** 0.5–1.5 mm diameter, round, radially elongated, daedaleoid to lamellate.

Hyphal system trimitic. **Generative hyphae** 2–6 µm diameter with clamp connections; **skeletal hyphae** 4–7 µm diameter; **binding hyphae** 2.0–4.5 µm diameter; **cystidia** lacking; **dendrohyphidia** in the hymenium with 3–8 short, acute branches in the apical 30 µm, walls thick, hyaline; **basidia** narrowly clavate, 30–45 × 4–5 µm, four sterigmate; **basidiospores** allantoid, 7–11 × 2.0–2.5 µm, walls hyaline, thin, smooth, neither amyloid nor dextrinoid.

Notes: An extremely variable polypore, especially in the colours, and the size and shape of the pores. Some actively growing, light-coloured, young specimens stain dull vinaceous red where bruised.

This is a page from the book, *Polypores of British Columbia (Fungi: Basidiomycota*)

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THE MYCOPHILE

Mushroom of the Issue

Coltricia montagnei Photo by Dianna Smith

Like the other 40+ described species of *Coltricia* on the planet, ***Coltricia montagnei*** (Fr.) Murrill is a mycorrhizal stipitate annual 'polypore' in the Hymenochaetaceae. It is a relatively uncommon hairy brown to rust-brown circular, tough, thickish polypore with a sturdy vevety brown stem that tapers toward the base. It grows mainly under hardwoods east of the Rockies. Most unusual is the development on the hymenium of irregular pores that often times split as the fruting body develops resulting in the appearance of concentrically arranged plates or zonations of woody 'gills'. It has a light brown spore print.